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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/540,361	03/31/2000	Rajeev Koodli	NC17353	2371

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EXAMINER	
JAGANNATHAN, MELANIE	

ART UNIT	PAPER NUMBER
2616	

DATE MAILED: 04/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/540,361	KOODLI, RAJEEV	
	Examiner	Art Unit	
	Melanie Jagannathan	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *5-11 and 16-22* is/are allowed.

6)☒ Claim(s) *1-4,12-15,23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

- Examiner has considered Amendment after Non-Final mailed 12/22/2005
- Claims 1-26 are pending.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 2-4, 12, and 13-15 are rejected under 35 U.S.C. 102(a) as being anticipated by Feng, Wu-Chang et al. "Adaptive Packet Marking for Maintaining End-to-End Throughput in a Differentiated-Services Internet", IEEE, October 1999.

Regarding claim 1, the claimed sending rate estimate is disclosed by user or network administrator specifying a desired minimum service rate for connection or connection group. See page 685, column 2, lines 34-37, page 686, column 4, lines 18-24. The claimed probabilistically marking a packet to one of a plurality of priority levels based on sending rate estimate is disclosed by packet-marking engine for monitoring and sustaining the requested level of service by setting ToS bits in packet headers appropriately. See page 685, column 2, lines 37-45, page 686, column 1, lines 1-3. The claimed determining any credits or debits for packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met is disclosed by PME marks packets belonging to the

connection or connection group, the fraction of marked packets varies from zero to one depending upon the measured and target throughputs such that the PME continually adjusts the fraction of packets marked in order to sustain a bandwidth close to the requested target rate while keeping number of marked packets as low as possible. See page 686, column 1, lines 11-48, page 687, lines 6-23.

Regarding claims 2-4, 12, 13-14, 15, the claimed sending rate estimate is disclosed by user or network administrator specifying a desired minimum service rate for connection or connection group. See page 685, column 2, lines 34-37, page 686, column 4, lines 18-24. The claimed probabilistically marking a packet to one of a plurality of priority levels based on sending rate estimate is disclosed by packet-marking engine for monitoring and sustaining the requested level of service by setting ToS bits in packet headers appropriately. See page 685, column 2, lines 37-45, page 686, column 1, lines 1-3. The claimed determining any credits or debits for packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met is disclosed by PME marks packets belonging to the connection or connection group, the fraction of marked packets varies from zero to one depending upon the measured and target throughputs such that the PME continually adjusts the fraction of packets marked in order to sustain a bandwidth close to the requested target rate while keeping number of marked packets as low as possible. See page 687, column 1, lines 11-48, page 687, column 2, lines 6-23. The claimed determining if sending rate estimate is less than first rate threshold or between a first rate threshold and second rate threshold and in response to this setting a

probability of marking packet with a first selected priority level is disclosed by marking probability is periodically updated depending on observed bandwidth and corresponding target bandwidth. If observed bandwidth is less than target bandwidth, then packet-marking probability is incremented which is upgrading packets belonging to the connection to highest priority level. Similarly, if observed is less than target, packet-marking probability is decremented to best-effort. See page 686, column 1, lines 35-49, page 687, column 1, lines 11-48, column 2, lines 6-23.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 2-4, 12, 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clark et al. "Explicit Allocation of Best-Effort Packet Delivery Service", IEEE, August 1998 in view of Bechtolsheim et al. US 6,515,963.

Regarding claim 1, the claimed sending rate estimate is disclosed by Clark et al. by expected throughput or target rate. See page 366, column 1, lines 31-34. The claimed probabilistically marking a packet to one of a plurality of priority levels based on sending rate estimate is disclosed by Clark et al. by when average queue size has exceeded a certain threshold, RED routers drops each arriving packet with a certain probability. See page 367, lines 19-30.

Clark et al. discloses all of the limitations of the claims except for determining any credits or debits for the packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay under the flow limit for several queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. At the time the invention was made it would have been obvious to a person of ordinary skill in the art to modify Clark et al. with credits and flow limits of Bechtolsheim et al. One of ordinary skill in the art would be motivated to do this since a credit scheme ensures fair allocations of bandwidth. See column 10, lines 47-49.

Regarding claims 2-4, 12-15, the claimed sending rate estimate is disclosed by Clark et al. by expected throughput or target rate. Different levels of service have different target rates. See page 366, column 1, lines 31-34. The claimed probabilistically marking a packet to one of a plurality of priority levels based on sending rate estimate is disclosed Clark et al. by when average queue size has exceeded a

certain threshold, RED routers drops each arriving packet with a certain probability. See page 367, lines 19-30.

The claimed determining if sending rate estimate is less than first rate threshold or between a first rate threshold and second rate threshold and in response to this setting a probability of marking packet with a first selected priority level is disclosed by Clark et al. by parameters min threshold and max threshold where if average queue size is below min threshold, no packets are dropped. When the average queue size is between the two thresholds, each packet drop serves the purpose of reducing the sending rate and when average queue size is above max threshold, then every arriving packet is dropped hoping to maintain a short queue size.

Clark et al. discloses all of the limitations of the claims except for determining any credits or debits for the packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay under the flow limit for several queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. At the time the invention was made it would have been

obvious to a person of ordinary skill in the art to modify Clark et al. with credits and flow limits of Bechtolsheim et al. One of ordinary skill in the art would be motivated to do this since a credit scheme ensures fair allocations of bandwidth. See column 10, lines 47-49.

5. Claims 1, 12, 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Skirmont US 6,252,848 in view of Bechtolsheim et al. US 6,515,963.

Regarding claim 1, 24, the claimed sending rate estimate is disclosed by Skirmont by ingress flow rate. The claimed probabilistically marking a packet to one of a plurality of priority levels based on sending rate estimate is disclosed by Skirmont by packets marked with a marking based on criteria including ingress flow rate measurements and flow profiles. See column 4, lines 7-59.

Skirmont discloses all of the limitations of the claims except for determining any credits or debits for the packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay under the flow limit for several

queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. At the time the invention was made it would have been obvious to a person of ordinary skill in the art to modify Skirmont with credits and flow limits of Bechtolsheim et al. One of ordinary skill in the art would be motivated to do this since a credit scheme ensures fair allocations of bandwidth. See column 10, lines 47-49.

Regarding claims 12, 25, 26, the claimed means or metering tool for determining sending rate estimate is disclosed by Skirmont by monitoring of ingress flow rate of a plurality of flows by traffic monitors (Figure 1, elements M1-M3) with ingress monitors for each flow associated with a channel. See column 3, lines 14-32, column 4, lines 1-67. The claimed means for probabilistically marking a packet to one of a plurality of priority levels based on sending rate estimate is disclosed by Skirmont by traffic monitor with packet marker which marks packets based on criteria including ingress flow rate measurements and flow profiles. See column 4, lines 7-59.

Skirmont discloses all of the limitations of the claims except for determining any credits or debits for the packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit

threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay under the flow limit for several queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. At the time the invention was made it would have been obvious to a person of ordinary skill in the art to modify Skirmont with credits and flow limits of Bechtolsheim et al. One of ordinary skill in the art would be motivated to do this since a credit scheme ensures fair allocations of bandwidth. See column 10, lines 47-49.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al. US 6,463,068 in view of Bechtolsheim et al. US 6,515,963.

The claimed determining a first probability using a first algorithm, at least one second probability using a second algorithm, the first and second algorithm being different and weighting each probability so that each contribute to net probability is disclosed by Lin et al. by weighted average free queue depth calculation in Lin's WRED scheme. WRED packet drop probability is based on maximum and minimum thresholds and a mark probability denominator. The rate of packet drop increases linearly as the average queue size increases until it reaches the maximum threshold and the mark probability denominator is the fraction of packets dropped when the average queue depth is at maximum threshold. In WRED, the minimum threshold value should be set high enough to

maximize the link utilization. If the minimum threshold is too low, packets may be dropped unnecessarily, and the transmission link will not be fully used.

Lin discloses a WRED processor (Figure 2, element 22) determines a new weighted average free queue depth using current weighted average free queue depth, a weighted factor W and the instantaneous size of free queue. The weighted average is compared with the predetermined minimum and maximum thresholds and if it falls between the thresholds, a probability of discard is calculated using weighted average value. See column 4, lines 39-67 and column 5. Examiner interprets first algorithm as determination of minimum threshold that cannot be set too low to result in unnecessary drops and second algorithm as determination of maximum threshold. Lin discloses the maximum and minimum thresholds are set relative to one another such that the loss priorities associated with the classes of service are maintained. See column 2, lines 37-39.

Lin et al. does not disclose determining any credits or debits for the packet stream, wherein a probability marking of the packet stream is improved while there is sufficiently accumulated credit and when a first criterion is met. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay

under the flow limit for several queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. At the time the invention was made it would have been obvious to a person of ordinary skill in the art to modify Lin et al. with credits and flow limits of Bechtolsheim et al. One of ordinary skill in the art would be motivated to do this since a credit scheme ensures fair allocations of bandwidth. See column 10, lines 47-49.

Allowable Subject Matter

7. Claims 5-11 and 16-22 are allowable over prior art.

Regarding claim 5, the prior art does not disclose if sending rate is between a first and second rate threshold, marking a packet such that a rate of packets marked a subordinate priority level is no greater than 1-(FRT/s) in combination with other limitations of the claims.

Regarding claims 6, 17, the prior art does not disclose if sending rate is greater than second rate threshold, marking a packet such that the rate of packets marked a second priority level is (SRT – FRT)/s in combination with other limitations of the claims.

Regarding claims 8, 19, the prior art does not disclose if sending rate is greater than the rate threshold, determining if a burst size is greater than a minimum burst and in response that burst size is greater than minimum burst marking the packet a first priority level in combination with other limitations of the claims.

Regarding claims 10, 21, the prior art does not disclose if sending rate is greater than the super rate threshold, determining if a burst size is greater than a minimum

burst and in response that burst size is greater than minimum burst marking the packet a highest priority level in combination with other limitations of the claims.

Regarding claim 16, prior art of record does not disclose, in single or in combination, marking a data packet such that rate of packet marked a subordinate priority level is no greater than 1-(FRT/s) in response to determination sending rate estimate is between a first rate threshold and a second threshold.

Response to Arguments

8. Applicant's arguments filed 12/22/2005 have been considered but are moot in view of the new ground(s) of rejection.

Regarding claim 23, Applicant argues Lin does not disclose amended limitation of determining any credits or debits for packet stream, wherein a probability marking of the packet stream is improved while there is a sufficiently accumulated credit and when a first criterion is met. Reference Bechtolscheim is submitted as part of new grounds of rejection for claim 23.

Regarding claims 1 and 12, Applicant argues reference Feng does not disclose determining any credits or debits for packet stream, wherein a probability marking of the packet stream is improved while there is a sufficiently accumulated credit and when a first criterion is met.

Examiner respectfully disagrees. Feng discloses a packet-marking scheme allowing an individual connection to achieve a target throughput and the throughput is monitored in order to adjust the packet marking. Examiner interprets the claimed credit

for packet stream with the connection's throughput measuring closer to the target throughput. Examiner interprets the claimed probability marking of the packet stream is improved while there is a sufficiently accumulated credit and when a first criterion is met is disclosed by the fraction of marked packets is continually adjusted, varying from zero to one depending upon the criteria of the measured throughput compared to the target throughput. The packet-marking engine adjusts the fraction of marked packets in order to sustain a bandwidth close to the requested target rate, while keeping the amount of marked packets low.

Regarding 103 rejection of claims 1 and 12 with references Clark and Bechtolscheim, Applicant argues references Clark nor Bechtolscheim disclose the claimed determining any credits or debits for packet stream, but does not teach improving the probability marking of the packet stream while there is a sufficiently accumulated credit and when a first criterion is met.

Examiner respectfully disagrees. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay under the flow limit for several queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. Examiner interprets the claimed improving the

probability of marking a stream while there is sufficiently accumulated credit with Bechtolsheim's disclosure of a non-adaptive flow must stay under the non-adaptive flow limit (the claimed first criterion is met) to build up enough credits to be reclassified as adapting (sufficiently accumulated credit). A credit value is decremented on marking so if the credits are being built, the probability of marking a stream must be improving.

Regarding 103 rejection of claims 1, 12, 24-26 with references Skirmont and Bechtolscheim, Applicant argues references Skirmont nor Bechtolscheim disclose the claimed determining any credits or debits for packet stream, but does not teach improving the probability marking of the packet stream while there is a sufficiently accumulated credit and when a first criterion is met.

Examiner respectfully disagrees. Bechtolsheim et al. discloses credit field in flow table for each indexed flow table entry so a flow over its dynamic buffer limit incurring a drop probability could send some amount of packets to exhausts credits. Credits are incremented on enqueueing and decremented on marking or dropping. See column 10, lines 1-35, column 12, lines 1-23. Once a flow exhausts its credits or reaches a minimum credit threshold level, it is deemed non-adaptive and a separate non-adaptive flow limit is enforced for that flow. A non-adaptive flow must stay under the flow limit for several queuing operations to build up enough credits so that it will be classified as an adapting flow and allowed queue space. Examiner interprets the claimed improving the probability of marking a stream while there is sufficiently accumulated credit with Bechtolsheim's disclosure of a non-adaptive flow must stay under the non-adaptive flow limit (the claimed first criterion is met) to build up enough credits to be reclassified as

adapting (sufficiently accumulated credit). A credit value is decremented on marking so if the credits are being built, the probability of marking a stream must be improving.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
4/3/06

CHI PHAM
SUPERVISORY PATENT EXAMINER
4/3/06